

<https://doi.org/10.23913/ride.v15i29.2228>

Scientific articles

**Cultura ambiental en una Institución de Educación Superior (IES)
sinaloense, aportando al desarrollo sostenible desde la
perspectiva estudiantil**

*Environmental culture in a sinaloense higher education institution,
contributing to sustainable development from the student perspective*

*Cultura ambiental em uma Instituição de Ensino Superior (IES) de Sinaloa,
contribuindo para o Desenvolvimento Sustentável na perspectiva do
estudante*

Rosa Elena De Anda Montaña

Universidad Autónoma de Occidente, México

rosa.deanda@uadeo.mx

<https://orcid.org/0000-0002-4223-0950>

Raúl Portillo Molina

Universidad Autónoma de Occidente, México

raul.portillo@uadeo.mx

<https://orcid.org/0000-0003-4756-4981>

María de los Ángeles Cervantes Rosas

Universidad Autónoma de Occidente, México

maria.cervantes@uadeo.mx

<https://orcid.org/0000-0003-3338-4816>

Resumen

La crisis ambiental que sobrelleva nuestro planeta, ocasionada principalmente por el estilo de vida ligado al consumismo, ha generado gran preocupación en los distintos ámbitos, sobre todo en el educativo, tal es el caso de las Instituciones de Educación Superior (IES), que día a día llevan a cabo estrategias para formar personas comprometidas y responsables que no sólo se consoliden académicamente, sino también en lo social, y contribuyan al progreso de las condiciones del planeta. Es por ello, que el objetivo de esta investigación es identificar los factores que motivan a estudiantes a involucrarse en actividades que contribuyan al logro



de una cultura ambiental aportando al desarrollo sostenible desde su formación profesional. Bajo un enfoque cuantitativo, de naturaleza exploratoria-descriptiva, se aplicó un cuestionario con escala de Likert a una muestra de 337 estudiantes de la Universidad Autónoma de Occidente Unidad, Regional Guasave. Los hallazgos revelaron que los principales factores son los valores personales como la responsabilidad, el nivel de cultura y la conciencia ambiental; mismos que se reflejan no sólo en la participación en actividades de cuidado del medio ambiente, sino en adquisición de productos sostenibles, cambios en estilos de vida y por ende en la reducción de huella ecológica. Finalmente, se observa como un área de oportunidad, un mayor grado de involucramiento de las IES alineando sus actividades al desarrollo sostenible y capacitando a sus docentes en el mismo sentido.

Palabras clave: actividades proambientales, educación ambiental, sustentabilidad, universidades.

Abstract

The environmental crisis that our planet is facing, generated mainly by the lifestyle linked to consumerism, has generated great concern in different areas, especially in education, such is the case of Higher Education Institutions (HEIs), which today Every day they carry out strategies to train committed and responsible people who not only consolidate academically, but also socially, and contribute to the progress of the conditions of the planet. For this reason, the objective of this research is to identify the factors that motivate students to get involved in activities that contribute to the achievement of an environmental culture, contributing to sustainable development from their professional training. Under a quantitative approach, of an exploratory-descriptive nature, a questionnaire with a Likert scale was applied to a sample of 337 students from the Autonomous University of the West Unidad, Regional Guasave. The findings revealed that the main factors are personal values such as responsibility, level of culture and environmental awareness; which are reflected not only in participation in environmental care activities, but also in the acquisition of sustainable products, changes in lifestyles and therefore in the reduction of the ecological footprint. Finally, a greater degree of involvement of HEIs is observed as an area of opportunity, aligning their activities with sustainable development and training their teachers in the same sense.

Keywords: pro-environmental activities, environmental education, sustainability, universities.

Resumo

A crise ambiental que nosso planeta enfrenta, gerada principalmente pelo estilo de vida ligado ao consumismo, tem gerado grande preocupação em diversas áreas, principalmente na educação, como é o caso das Instituições de Ensino Superior (IES), que hoje realizam diariamente estratégias formar pessoas comprometidas e responsáveis que se consolidem não só academicamente, mas também socialmente, e contribuam para o progresso das condições do planeta. Por esse motivo, o objetivo desta pesquisa é identificar os fatores que motivam os alunos a se envolverem em atividades que contribuam para o alcance de uma cultura ambiental, contribuindo para o desenvolvimento sustentável a partir de sua formação profissional. Sob uma abordagem quantitativa, de caráter exploratório-descritivo, aplicou-se um questionário com escala Likert a uma amostra de 337 estudantes da Universidade Autônoma da Unidade Ocidental, Regional Guasave. Os resultados revelaram que os principais fatores são valores pessoais como responsabilidade, nível de cultura e consciência ambiental; que se refletem não só na participação em atividades de cuidado ambiental, mas também na aquisição de produtos sustentáveis, na mudança de estilos de vida e, portanto, na redução da pegada ecológica. Por fim, um maior grau de envolvimento das IES, alinhando as suas atividades com o desenvolvimento sustentável e formando os seus professores no mesmo sentido, é observado como uma área de oportunidade.

Palavras-chave: atividades pró-ambientais, educação ambiental, sustentabilidade, universidades.

Reception Date: July 2024

Acceptance Date: November 2024

Introduction

Currently, the planet is suffering from an environmental crisis caused mainly by the lifestyle linked to consumerism that generates large amounts of waste that contaminate and limit natural resources, compromising the possibilities of future generations (Cayllahua, 2019; Parra, 2019). Perceiving that these Environmental effects are caused by a lack of awareness, which implies assuming the responsibility of modifying these habits and lifestyles so that they favor the care, protection and conservation of the environment (Parra, 2019; Rattia, 2022).

Culture is part of and shapes lifestyles, such as values, beliefs, convictions, habits, customs, human expressiveness, languages, knowledge and arts, traditions, institutions and

ways of life through which people manifest their humanity (Martinell, 2020; Severiche *et al* ., 2016), then "education, as an inherent part of culture, would be the best training means to adapt that culture" (Severiche *et al* ., 2016, p. 272). In this same sense, González (2003) points out the importance of promoting a new formation of culture based on respect for life, not just human life.

For this reason, it is of great importance that Higher Education Institutions (HEI) assume their commitment and incorporate into their actions, in addition to training with quality education and research, social projection, to train committed and responsible people who not only consolidate themselves in the academic part, but also in the social part, and contribute to the improvement of the conditions of the planet, generating positive impacts on the environmental culture of the communities, in which, in the short term, they will develop professionally (Callejas *et al* ., 2018).

In this same sense, Severiche *et al* . (2016) indicate that it is unavoidable that educational strategies are updated with the aim of understanding and mitigating, from different points of view, the environmental deterioration that the planet suffers; environmental education gains great importance as a cultural basis within the training received in HEIs, to achieve good ecological attitudes in students (Cabrera, 2021).

Therefore, the objective of this research is to identify the factors that motivate students of the Autonomous University of the West, Guasave Regional Unit to get involved in activities that contribute to the achievement of an environmental culture contributing to sustainable development from their professional training.

Literature review

Environmental culture is a process that involves committing to transmitting attitudes and values in university communities, both locally, nationally and internationally, with the purpose of promoting the adoption of responsible actions; therefore, it considers the transformation of behaviors through social work (Olivera, 2023).

Likewise, Pérez and Arroyo (2022) indicate that environmental culture reflects how people interact with their environment, expressing their attitudes, behaviors, and knowledge about the environment; asserting that it is possible to transmit it from generation to generation, through a solid environmental education. However, it is important to highlight that, within the educational field, environmental culture not only consists of including care for the environment in academic programs, but it is also necessary to develop and implement

pedagogical strategies, management actions, and inter-institutional coordination, while strengthening values, and adapting human behavior towards a pro-environmental one, coinciding with what Vanegas and Riascos (2022, p. 2457) point out:

It is imperative to establish processes of education, from an early age, and environmental re-education, in such a way that it allows individuals to generate a state of consciousness that allows them to value the environment as a vital agent that requires care and specific actions from a perspective of a sustainable and sustainable relationship between man and nature. To do so, educational processes must generate interaction between the environment and students, based on the identification of contextual problems and the determination of the respective actions.

Environmental education is a concept that has been used since 1969, however, it is a requirement in today's society; it is essential to cultivate a collective awareness about the importance of protecting and preserving the natural environment for present and future generations (Castro and Leal, 2023; Guevara *et al.* , 2023; Márquez *et al.* , 2021). This form of education not only focuses on understanding environmental problems, but also on promoting individual and collective action to address and solve them. By integrating environmental education into cultural training, a sustainable mindset is fostered that influences all areas of life, from the way resources are consumed to the relationship with the environment. In addition, it provides people with the necessary skills to make informed decisions about environmental issues and contribute to problem solving. It is crucial that environmental education is not limited to classrooms alone, but is integrated into all facets of society, from the home to the workplace and the community at large. The more deeply rooted this environmental awareness is in culture, the more effective it will be in protecting our planet (Castro and Leal, 2023; Serna *et al.* , 2023).

In this sense, educational institutions have the obligation to train people for a more sustainable future in economic, social and environmental terms, acting as agents of change; at the same time guiding and supporting them in the use of knowledge and scientific and technological advances achieved by humanity; since the participation of young people is crucial to building a more sustainable society (Callejas *et al.* , 2018; Rodríguez, 2022).

Similarly, the Sustainable Development Solutions Network (SDSN) reveals that:

To effectively address the SDGs, we need professionals and citizens who have the skills, knowledge and mindset to address the complex sustainable development challenges articulated in the SDGs across whatever career or life path they take. These

include: a general understanding of sustainable development and the SDGs; transversal skills to make sense of complex challenges and devise and implement solutions; and specific knowledge and skills on how each profession can contribute to the SDGs (SDSN, 2020, p. VII).

In this context, HEIs have a fundamental role in the training of individuals and professionals who participate in the execution of the Sustainable Development Goals (SDG) (Callejas *et al.* , 2018; Leal, 2020; Rentería *et al.* , 2022; Sánchez, 2018), while promoting research and innovation to meet some of the goals set out in the 2030 Agenda (Ibero-American General Secretariat [SEGIB], 2018).

Implying that, in many HEIs, their curricula are reformed and their managers and staff are trained about the SDGs, focusing them on action, using pedagogical approaches that promote collaboration, participation and the creation of alliances (Callejas *et al.* , 2018; Leal, 2020; Plata *et al.* , 2022; Sánchez 2018).

In the literature, the topic of environmental culture in HEIs is addressed from different areas and perspectives, as is the case of the research by Callejas *et al.* (2018) whose objective was to analyze the progress of the HEIs of Colombia in the process of institutionalization of environmental commitment, investigating the inclusion of environmental issues in areas that include, in addition to the substantive functions of teaching, research and extension, institutional policies and participation, management and environmental planning; 60 public and private HEIs, located in different regions of the country, participated in this study. The nature of the research is quantitative, exploratory, using descriptive statistics analysis and taking as a reference a scale established for each area based on proportions that limit the levels of environmental commitment of each of the HEIs. As a result, they found that the area of highest performance was that of government and participation, referring to the fact that HEIs express interest in strengthening environmental policies; On the other hand, the management and organization of the campus was placed at the lowest level, concluding on the need to generate strategies for self-regulation and institutional improvement in HEIs.

In this same context is the research carried out by Holguín (2017), which indicates that HEIs must involve all their *stakeholders* in the analysis, development and implementation of environmental policies, while developing the central tasks of education, research and extension within environmental management measures of the campuses linked to their mission and institutional development plans.

For their part, Moreno *et al.* (2019) conducted research to assess how university students prioritize the SDGs and the importance they give to those that are directly related to caring for the environment; as well as their interest in participating in pro-environmental activities; under a quantitative approach, applying an *ad hoc questionnaire* to a sample of 215 university students, finding that they show motivation to participate in pro-environmental activities, however, the environment is not a priority for the university students studied, since they mostly prioritize socioeconomic goals.

However, Leal *et al.* (2018) conducted research on the unavoidable commitment of teachers and students to achieve the transformation of learning in education for sustainability; using as a data collection tool, a set of qualitative case studies in higher education institutions in seven countries (Brazil, Serbia, Latvia, South Africa, Spain, Syria and the United Kingdom), finding that the concept of education for sustainable development has not been sufficiently integrated into the concept of transformation in HEIs; to improve sustainability in curricula, academics must develop collaborative approaches and discuss how to redesign their own disciplines and how to appreciate the epistemology and multicultural vision of sustainability, both as a topic and as a field of research in education. It was also found that academics' reflections on their own values are crucial to develop the transformative potential of students as agents of a sustainable future. Finally, universities need to transform themselves to serve as models of social justice and environmental management, and to foster learning about sustainability.

Materials and method

The research was carried out under a quantitative, non-experimental approach. The design was transversal with a descriptive scope (Baena, 2017; Ruiz and Valenzuela 2022), with the objective of identifying the factors that motivate students of the Autonomous University of the West, Guasave Regional Unit, to get involved in activities that contribute to the achievement of an environmental culture contributing to sustainable development from their professional training; For this purpose, a questionnaire composed of 23 items distributed in four sections was used as an instrument: sociodemographic data and the institutional, teacher and student dimensions. This instrument was applied through a survey with a 5-point Likert scale; using the Google Forms tool, sending the link to the different social media groups that the university uses to share information with students.

The study population was 4,897 students enrolled during the semester August 2022-January 2023, and the sample was determined with the statistical formula for finite populations with 95% confidence and 5% error, this being 356 students; however, there was a response of 94.6% which was 337 students, being non-probabilistic (Gallardo, 2017; Ruiz and Valenzuela 2022).

SPSS “ *Statistical* ” was used for data processing . *Package for the Social Sciences* ” V.25 , which is a computer statistical program used in social science research and applied sciences (Rodríguez and Reguant, 2020). After the descriptive analysis, the research question is answered.

Results

Sociodemographic profile

The descriptive analysis indicates the participation of 15 Educational Programs (hereinafter PE), which grouped 337 students, the largest being the Bachelor's Degree in Nursing, accounting for 16.0% of the total sample, followed by the Bachelor's Degree in Graphic Design and Visual Arts with 15.40%. The PEs with the lowest participation were Civil Engineering, Psychology, and Physical Therapy and Rehabilitation, with a participation of less than one percent of the total sample.

Regarding the gender of the subjects studied, 65% belong to the female gender, 34.4% to the male gender and a small part, 0.6% identified themselves as binary, the latter from the Graphic Design and Visual Arts PE. Regarding the participation of the female gender by PE , it was the Bachelor's Degree in Nursing that presented the highest frequency with 18.70% of the total of that gender; that of Graphic Design and Visual Arts, with 16.0% and that of Biology with 15.10 %. Of the 116 male respondents, 13.80% of participation came from the Business Administration PE; the Graphic Design and Visual Arts PE 12.90% and 12.10% from Biology. In that same sense, two students from the Graphic Design and Visual Arts PE, which represents 0.6% of the total population studied, responded as binary gender (*See Table 1*) .

Table 1. Participation by gender and educational program

Educational program	Gender			Total
	Male	Female	Binary	
Bachelor of Business Administration	13.80%	9.10%		10.70%
Bachelor of Physical Therapy and Rehabilitation	0.90%	0.50%		0.60%
Software Engineer	6.00%	2.30%		3.60%
Bachelor of Psychology	0.90%	0.50%		0.60%
Civil Engineer	0.90%			0.30%
Bachelor of Gastronomy	0.90%	2.70%		2.10%
Communication Sciences	5.20%	5.00%		5.00%
Bachelor of Nursing	11.20%	18.70%		16.00%
Bachelor of Biology	12.10%	15.10%		13.90%
Bachelor of Nutrition	5.20%	13.70%		10.70%
Bachelor of Graphic Design and Visual Arts	12.90%	16.00%	100.00%	15.40%
Bachelor of Computer Systems	9.50%	0.50%		3.60%
Bachelor of Accounting and Finance	4.30%	5.50%		5.00%
Bachelor of Architecture	11.20%	8.70%		9.50%
Industrial Engineer	5.20%	1.80%		3.00%

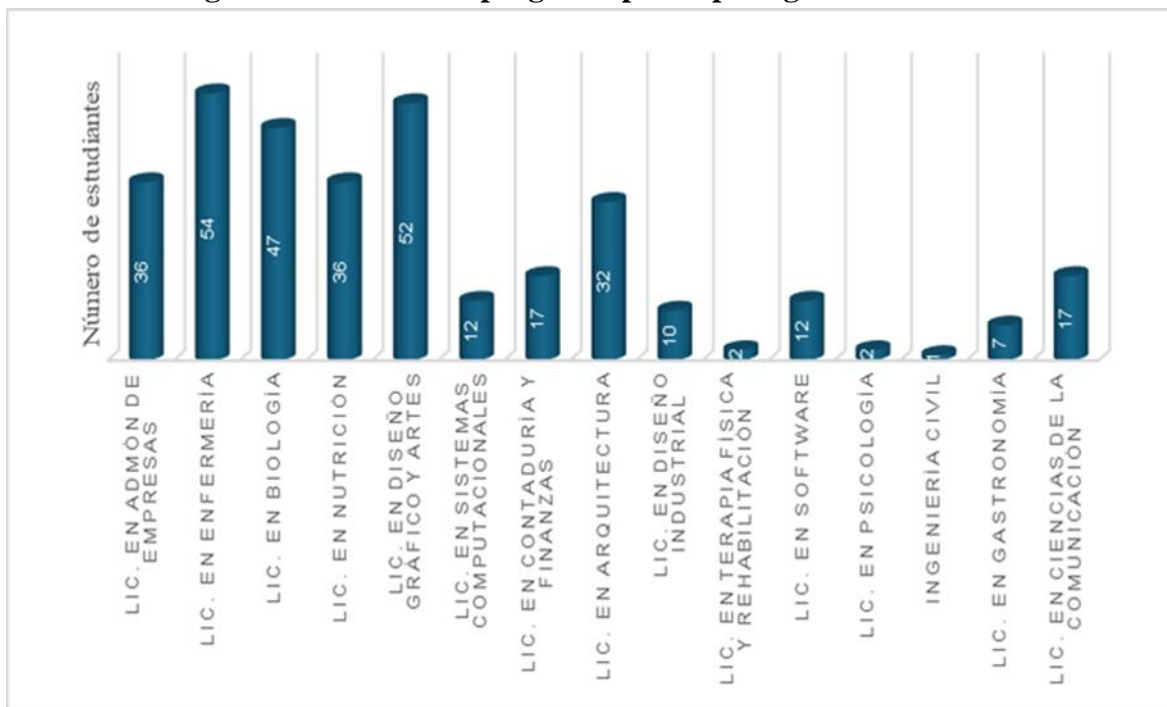
Source: Own elaboration

Another important fact in this study is to identify the semester in which the students in the sample were enrolled, obtaining as results that, in the 1st semester, 36.0% participated, followed by the 7th semester with 22.0%; students from the 3rd semester participated in 19%, and those from the 5th semester in 16.0%; while only 7.0% were students from the 9th semester, concluding that this result is due to the fact that students from this semester are outside the institution due to the completion of internships. Now, when talking about the age of the respondents, the results showed that the average age of the 337 students is 20 years old. However, it is necessary to mention that the age range projected by the results is from 17 to 34 years old.

The study population by PE is summarized in Figure 1; of the 337 students, 86.35% are grouped into eight PEs, of these, 54 belong to the Bachelor of Nursing; 52 to Graphic Design and Visual Arts; 47 to Biology; Business Administration and Nutrition with 36 each

and Architecture with 32; with 17 students the PEs of Accounting and Finance and Communication Sciences (*See Figure 1*).

Figure 1. Educational programs participating in the research .



Source: Own elaboration.

Analysis of environmental culture in students:

When asked about the degree of knowledge on the importance of good waste management, the results are encouraging, as 79.0% agree and totally agree with this question. On the other hand, seeing this as an area of opportunity, 6.60% indicated that they completely disagree and disagree, that is, they have little knowledge about the importance of waste management (*See Table 2*).

Table 2. Knowledge about the importance of good waste management by Educational Program

Educational program	You have knowledge about the importance of good waste management				
	Completely disagree	Disagree	Neither agree nor disagree	OK	Totally agree
Bachelor of Business Administration	5.6%	2.8%	11.1%	61.1%	19.4%
Communication Sciences				47.1%	52.9%
Bachelor of Nursing		5.6%	14.8%	53.7%	25.9%
Bachelor of Biology	4.3%		17.0%	31.9%	46.8%
Bachelor of Nutrition	2.8%	8.3%	13.9%	47.2%	27.8%
Bachelor of Graphic Design and Visual Arts	3.8%		17.3%	59.6%	19.2%
Bachelor of Accounting and Finance			11.8%	35.3%	52.9%
Bachelor of Architecture		3.1%	21.9%	56.3%	18.8%
Total	3.3%	3.3%	14.5%	49.3%	29.7%

Source: Own elaboration

Likewise, the results of the degree of knowledge of waste management by PE were also analyzed. All Communication Sciences students showed positive figures, indicating 100% knowledge. In the same sense, the Business Administration PE, with 80.5% of respondents, indicated a high degree of knowledge of the management of this type of waste. In third place were the Nursing PE students with 79.68% of favorable responses. Unknown to the reasons (seen as an area of opportunity), it was the Nutrition PE students who showed alarming figures, indicating that more than 11% of respondents lacked knowledge of the importance of resource management.

When inquiring about the policies established by the university in relation to the implementation of awareness campaigns on environmental care, comforting figures were detected, this is because only 8.0% indicated that they disagreed and totally disagreed, that

is, that this type of campaigns were almost non-existent within it, and in contrast, 73.0% stated that this type of actions are carried out.

This situation was further investigated, as not only were students asked whether there were policies within their university related to awareness campaigns on environmental care, but the degree of participation of students in this type of campaigns was also measured, revealing that only 1.10% of those who stated that awareness campaigns were carried out within the University did not participate in recycling activities and, conversely, 78.8% indicated that they agreed to participate.

However, when making a correlation between these two variables, it was found that it is weak, with a result of 0.427 of Pearson, which is interpreted as an average participation of students in awareness campaigns on environmental care; that is, that 42.7% of the variation of participation of students in recycling campaigns within the university depends on the institutional policy of awareness on environmental care (*see table 3*).

Table 3. Symmetrical measures between student participation and environmental awareness campaigns

		Worth	Asymptotic standard error ^a	Approx. S ^b	Approx. Next.
Interval by interval	R for person	.427	.055	8.651	.000 ^c
Ordinal by ordinal	Spearman correlation	.401	.051	8.022	.000 ^c
N of valid cases		337			
<i>Notes.</i> a. The null hypothesis is not assumed, b. The asymptotic standard error is used, assuming the null hypothesis, and c. It is based on normal approximation.					

Source: Own elaboration

Complementing the degree of commitment of students in caring for the environment and their level of responsibility, there is a positive correlation of 0.677, which could be interpreted as those who showed a low level of responsibility also indicated that they disagreed with participating in recycling activities, however, it was also stated that 80.9% who considered themselves to have a high level of responsibility agree to participate in campaigns or activities of this nature within the university, in that sense, these results are strengthened when it is detected that 66.8% fully agree to support this institutional policy of caring for the environment.

However, when analyzing the degree of participation in recycling activities by the teaching staff together with the students themselves, it was found that 72.7% of the students who do not participate or completely disagree with activities of this type indicated that teachers do not participate either. In an adverse approach, that is, in a positive way, it was also investigated that 70.0% of the students who completely agree with participating in recycling activities indicated that teachers also participate regularly (*see table 4*).

Table 4. Cross-reference between participation in recycling activities of students and teachers

		You participate in recycling activities on a regular basis within your University				
		Completely disagree	Disagree	Neither agree nor disagree	OK	Totally agree
Teachers participate in recycling activities on a regular basis	Completely disagree	72.7%	23%	0.9%		2.0%
	Disagree		23.3%	12.3%	0.8%	2.0%
	Neither agree nor disagree	27.3%	44.2%	45.6%	20.2%	6.0%
	OK		20.9%	27.2%	63.9%	20.0%
	Totally agree		9.3%	14.0%	15.1%	70.0%
Total		100.0%	100.0%	100.0%	100.0 %	100.0%

Source: Own elaboration

However, by making a simple linear regression model, taking the participation of students as the dependent variable and the participation of teachers as the independent variable, it was detected that 31.6% (R Square) of the variation of students who participate in this type of actions is explained or due to the variation in the participation of teachers (*see table 5*) .

Table 5. Summary of the simple linear regression model between student and teacher participation

Model	R	R squared	Adjusted R square	Standard error of the estimate
1	.562 ^a	.316	.314	.828

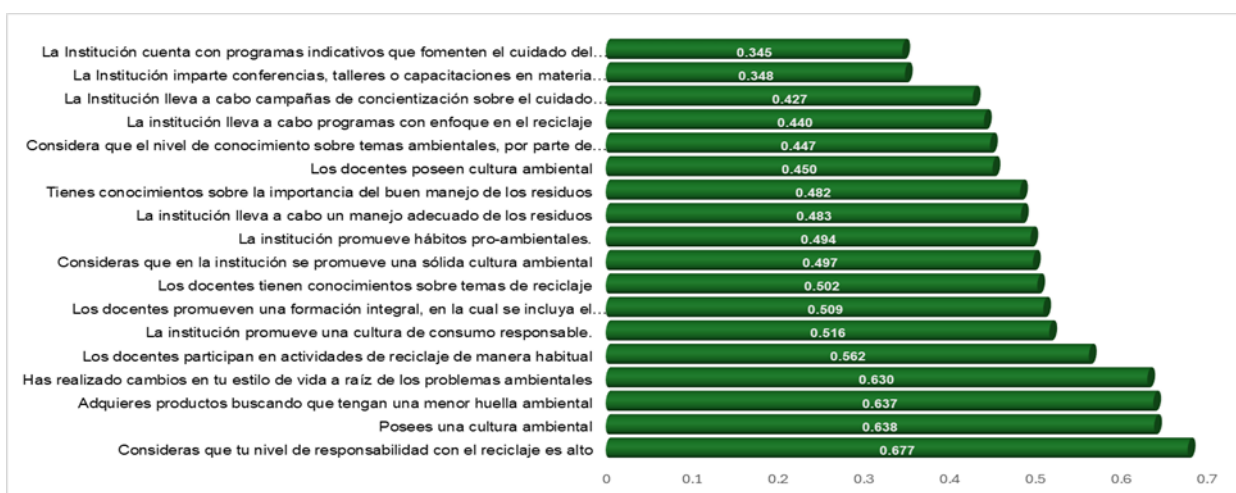
Note. a. Predictors: (Constant), Teachers participate in recycling activities on a regular basis.

Source: Own elaboration

In order to fulfill the objective of this research, it was determined that the main factors are those that emanate directly from the student themselves, such as: the degree of responsibility they possess, the level of environmental culture. This is reflected in the acquisition of environmentally friendly products and changes in their lifestyle as a result of environmental problems.

To cite just one example of the impact of these factors on the degree of participation of students in pro-environmental activities, when correlating the degree of participation of students and their level of responsibility, an intense positive correlation of 0.677 was determined between both variables, from which it can be deduced that the actions of students, from the perspective of their level of responsibility, have a considerable impact on pro-environmental activities; a positive variation in the degree of responsibility generates an increase in concern for the environment (see *figure 2*).

Figure 2. You regularly participate in pro-environmental activities within your University



Source: Own elaboration

In the same sense, the results showed at a midpoint that teachers have influence on the degree of participation of students in this type of practices, deriving a Pearson correlation

of 0.502 (see *figure 2*), which could be interpreted as a variation in the degree of knowledge of teachers on specific topics in this area generates a variation of 50.02%, of that degree of variation, in student participation.

Continuing with the statistical analysis, with the same dependent variable, alternating the independent variables, the importance of analyzing the results from the student perspective on the institution's intervention in activities of this nature and situation in their professional training is significant, since the results with the lowest correlation are: the institution has indicative programs that promote care for the environment with 0.345; the institution gives sufficient lectures, workshops or training courses on environmental matters 0.348 and, with 0.427, the institution carries out awareness campaigns on the care and protection of the environment, likewise, with 0.440 the institution carries out programs focused on recycling (see *figure 2*).

Table 6. Crossroads between the existence of indicative programs that promote environmental care and student participation in recycling activities within your University.

		You participate in recycling activities on a regular basis within your University
		Completely disagree
The Institution has indicative programs that promote environmental care	Completely disagree	36.36%
	Disagree	18.2%
	Neither agree nor disagree	18.2%
	OK	18.2%
	Totally agree	9.1%
Total		100.0%

Source: Own elaboration

From the above, the figures are very conclusive, this is because only 27.3% of the students who participate in recycling activities on a regular basis within your University attribute it to the fact that the Institution has indicative programs that promote care for the environment; however, the negative results are greater, 54.56% of the students totally disagree and disagree; being an area of opportunity for the Institution, to include this type of knowledge in all PE (see *table 6*) .

Discussion

When classifying personal factors and institutional factors that impact the participation of students in activities that contribute to the achievement of an environmental culture contributing to sustainable development from their professional training, the discouraging results found in this research can be pointed out, giving less credit to the latter.

The results attribute or give greater weight to personal factors such as values, responsibility, changes in lifestyles, ecological footprint, degree of environmental culture, among others, as those with the greatest influence on their professional training from a sustainable development perspective (González, 2003; Martinell, 2020; Parra, 2019; Rattia, 2022; Severiche *et al.*, 2016).

Complementarily, Cabrera (2021); Callejas *et al.* (2018); Leal *et al.* (2018); Plata *et al.* (2022); SEGIB (2018) and Holguín (2017) point out that HEIs must assume the commitment to train committed and responsible people who contribute to the improvement of environmental conditions, however, in this research, the nonexistence or lack of clarity in an institutional awareness policy was detected, and although the institution has indicative programs that promote environmental protection, these are not widespread in all PEs, so a large part of the students see it as a limitation; Likewise, universities do not implement programs with a focus on recycling.

Coming to another point, it is noted that there is concern among young people about protecting the environment, this by wanting to participate or being willing to support activities of this nature, implemented by university authorities (Olivera, 2023; Pérez and Arroyo, 2022); coinciding with what was stated by Moreno *et al.* (2019), in this research a motivation to participate in pro-environmental activities is perceived, generating positive impacts on the environmental culture of the communities in which, in the short term, they will develop professionally (Callejas *et al.*, 2018).

In addition, the participation of managers and teachers in professional training with sustainable impact is essential (Sánchez, 2018; Holguín, 2017); however, this research describes a medium participation by teachers in this type of actions, their influence on students is not alarming, this by demonstrating that there is a weak positive correlation in their actions.

It is important to note that it is necessary to have “professionals and citizens who have the skills, knowledge and mindset to address the complex sustainable development challenges articulated in the SDGs through any career or life path they take” (SDSN, 2020,

p. VII); characteristics that are concentrated in the term environmental culture (Olivera, 2023; Pérez and Arroyo, 2022).

Conclusions

The main factors that motivate students to get involved in activities that contribute to achieving an environmental culture that contributes to sustainable development from their professional training are personal values such as responsibility, level of culture and environmental awareness; these are key factors that significantly influence individual actions related to caring for the environment. These values are manifested not only in participation in environmental activities, but also in everyday decisions such as choosing sustainable products and changing lifestyles. Consequently, these actions contribute to reducing the personal and collective ecological footprint.

Environmental culture is a fundamental tool of education that allows students to acquire knowledge and develop skills focused on environmental care, with the aim of changing consumption patterns and maintaining a positive relationship with the environment. Education in HEIs must be of quality and focus on sustainable development in such a way that respect is promoted in all areas and is taught with solid ethical foundations. Only in this way can a future for humanity be guaranteed.

Absolutely, HEIs play a fundamental role in training professionals who not only master their field of study, but are also equipped to address pressing environmental challenges at local and global levels. This involves not only imparting specific technical knowledge and skills, but also cultivating attitudes and values that promote environmental responsibility, sustainability, a culture of peace and the reduction of inequalities.

Today's environmental problems, such as climate change, biodiversity loss and pollution, require innovative and collaborative solutions. Institutions must therefore integrate into their educational programmes the teaching of sustainable practices, the development of clean technologies, effective environmental management and raising awareness of the importance of conserving natural resources.

Furthermore, it is crucial that future professionals are prepared to face these challenges in an interdisciplinary and collaborative manner, working alongside other sectors of society, including governments, businesses and non-governmental organisations. This will not only contribute to mitigating negative environmental impacts, but will also foster more

equitable and sustainable economic and social development in the long term. In short, training well-rounded professionals with a strong environmental commitment is essential to address global and local environmental problems in an effective and sustainable manner.

Future lines of research

The document focuses on the perception of students; however, it is important to analyze the institutional plans of HEIs on environmental culture and the way in which it is addressed; since they are one of the key actors in achieving the SDGs, understanding that environmental culture is one of the tools of education focused on sustainability.

References

- Baena, G. (2017). *Metodología de la investigación. Serie integral por competencias*. Grupo Editorial Patria.
http://www.biblioteca.cij.gob.mx/Archivos/Materiales_de_consulta/Drogas_de_Abu_so/Articulos/metodologia%20de%20la%20investigacion.pdf
- Cabrera, O. (2021). La educación ambiental como base cultural y estrategia para mejorar actitudes ecológicas en estudiantes. *Ciencia Latina. Revista Científica Multidisciplinar* 5(4). https://doi.org/10.37811/cl_rcm.v5i4.707.
- Callejas Restrepo, M. M., Sáenz Zapata, O., Plata Rangel, Á. M., Holguín Aguirre, M. T. y Mora Penagos, W. M. (2018). El Compromiso Ambiental de Instituciones de Educación Superior en Colombia. *Praxis & Saber*, 9(21), 197-220.
<https://doi.org/10.19053/22160159.v9.n21.2018.8928>
- Castro, A. y Leal, D. (2023). ¿Educación ambiental o educación para el desarrollo sostenible? El sentido ético de la educación ambiental. *Revista Kawsaypacha: Sociedad y Medio Ambiente*, (11), A-007. <https://doi.org/10.18800/kawsaypacha.202301.A007>
- Cayllahua, E. (2019). *La educación ambiental en el cuidado del ambiente en estudiantes de la IES "Sergio Quijada Jara" de Pallalla*. [Tesis de maestría, Universidad Nacional de Huancavelica]. Repositorio Institucional.
<https://repositorio.unh.edu.pe/bitstreams/c5a398b5-df16-4e47-bf15-fa788f2678d3/download>
- Gallardo, E. (2017). *Metodología de la Investigación: manual autoformativo interactivo*. Universidad Continental.
https://repositorio.continental.edu.pe/bitstream/20.500.12394/4278/1/DO_UC_EG_MAI_UC0584_2018.pdf
- González, H. (2003). Educación para la ciudadanía ambiental. *Interciencia*, 28(10), 611-615.
- Guevara, I.; Pérez, J. L. y Bravo, B. (2023). Impacto de los Objetivos de Desarrollo Sostenible en la investigación educativa sobre Educación Ambiental. *Revista Eureka sobre Enseñanza y Divulgación de las Ciencias*, 20(2).
https://doi.org/10.25267/Rev_Eureka_ensen_divulg_cienc.2023.v20.i2.2501
- Holguín, M. (2017). *Inclusión de la Dimensión Ambiental desde la Perspectiva Sistémica en la Educación Superior. Estudio de Caso de la Universidad Libre –Sede Principal– como Referente para un Modelo Institucional*. Universidad Libre.
<https://www.unilibre.edu.co/bogota/pdfs/2017/siaulmt.pdf>

- Leal, W. (2020). Viewpoint: Accelerating the implementation of the SDGs. *International Journal of Sustainability in Higher Education*, 21(3), 507-511. <https://doi.org/10.1108/IJSHE-01-2020-0011>
- Leal, W., S. Raath, S., Lazzarini, B., Vargas, V., De Souza, L., Anholon, R., Quelhas, O., Haddad, R., Klavins, M. y Orlovic, V. (2018). The role of transformation in learning and education for sustainability. *Journal of Cleaner Production*, 199, 286-295. <https://doi.org/10.1016/j.jclepro.2018.07.017>
- Márquez, D., Hernández, A., Márquez, L. y Casas, M. (2021). La educación ambiental: evolución conceptual y metodológica hacia los objetivos del desarrollo sostenible. *Revista Universidad y Sociedad*, 13(2), 301-310. <https://rus.ucf.edu.cu/index.php/rus/article/view/1968>
- Martinell, A. (2020). *Cultura y Desarrollo Sostenible. Aportaciones al debate sobre la dimensión cultural de la Agenda 2030*. REDS. https://reds-sdsn.es/wp-content/uploads/2020/04/REDS_Cultura-y-desarrollo-sostenible-2020.pdf
- Moreno, J., Rodríguez, L. y Favara, J. (2019). Conciencia ambiental en estudiantes universitarios. Un estudio de la jerarquización de los Objetivos de Desarrollo Sustentable (ODS). *Revista de Psicología*, 15(29), 113-119. <https://repositorio.uca.edu.ar/handle/123456789/9559>
- Olivera, E. (2023). *Propuesta de campaña social para comunicar las acciones de la brigada ambiental de la Universidad Señor de Sipan*. [Tesis de licenciatura, Universidad Señor de Sipan]. Repositorio Institucional. <https://repositorio.uss.edu.pe/handle/20.500.12802/11197>
- Parra, C. (2019). *La cultura ambiental como elemento del desarrollo sostenible del Municipio de la Villa de San Diego de Ubaté*. [Tesis de maestría, Instituto Superior de Educación y Ciencias]. Repositorio Institucional. <https://comum.rcaap.pt/bitstream/10400.26/39145/1/Christians%20Olarde.pdf>
- Pérez, N. y Arroyo, J. (2022). Cultura ambiental desde la proyección social comunitaria para la comprensión colectiva de la sustentabilidad. *Tecné, Episteme y Didaxis: TED*, 52, 283-302. <https://doi.org/10.17227/ted.num52-11921>
- Plata, Á. M., Holguín, M. T., Saénz, O. y Callejas, M. M. (2022). Agenda 2030 y Objetivos de Desarrollo Sostenible: aportes de las instituciones de educación superior en la dimensión ambiental. *Educación y Educadores*, 25(2), e2524. <https://doi.org/10.5294/edu.2022.25.2.4>

- Rattia, N. S. (2022). Cultura ambientalista: una perspectiva transdisciplinaria de la formación ciudadana en la era planetaria. *Guayana Moderna*, 11(11), 325-339. <https://revistasenlinea.saber.ucab.edu.ve/index.php/guayanamoderna/article/view/5874>
- Rentería, J.; Hincapí, E.; Rodríguez, Y.; Vélez, Ch.; Osorio, B. y Durango, J. (2022). Competencia global para el desarrollo sostenible: una oportunidad para la educación superior. *Entramado*, 18(1), e-7641. 1-21. <https://doi.org/10.18041/1900-3803/entramado.1.7641>
- Rodríguez, J. y Reguant, M. (2020). Calcular la fiabilidad de un cuestionario o escala mediante el SPSS: el coeficiente alfa de Cronbach. *REIRE Revista d'Innovació i Recerca en Educació*, 13(2), 1-13. <https://doi.org/10.1344/reire2020.13.230048>
- Rodríguez, M. (2022). Los objetivos de desarrollo sostenible y la cultura como recurso educativo para la formación de jóvenes como agentes de cambio social. *Eirene estudios de paz y conflictos*, 5(9), 195-222. <https://www.estudiosdepazyconflictos.com/index.php/eirene/article/view/181>
- Ruiz, C. y Valenzuela, M. (2022). *Metodología de la investigación*. Universidad Nacional Autónoma de Tayacaja Daniel Hernández Morillo (UNAT)-Fondo Editorial. <https://fondoeditorial.unat.edu.pe/index.php/EdiUnat/catalog/book/4>
- Sánchez, G. (2018). La formación para el desarrollo sostenible: función esencial de la universidad. En el papel de la Universidad Iberoamericana en la Agenda 2030. [Seminario], SEGIB, Salamanca. Archivo digital. https://www.segib.org/wp-content/uploads/El_papel_de_la_Universidad_IB_en_Agenda2030.pdf
- Secretaría General Iberoamericana (SEGIB). (2018). El Papel de la Universidad Iberoamericana en la Agenda 2030. [Seminario], SEGIB, Salamanca. https://www.segib.org/wp-content/uploads/El_papel_de_la_Universidad_IB_en_Agenda2030.pdf
- Serna, O., Guerrero, C. y Salgado, G. (2023). Propuesta de intervención de educación ambiental sobre el cambio climático en la formación de docentes. En R. Calixto y M. Silva (Coord.). *Educación ambiental, agua y cambio climático: nuevos escenarios* (pp. 27-51). Universidad Veracruzana. <https://www.uv.mx/bdh/files/2023/11/Educacion-ambiental-agua-y-cambio.pdf>

Severiche, C., Gómez, E. y Jaimes, J. (2016). La educación ambiental como base cultural y estrategia para el desarrollo sostenible. *Telos*, 18(2), 266-281.
<https://www.calameo.com/read/005573338bacc9d4b5012>

Sustainable Development Solutions Network (SDSN). (2020). *Acelerando la educación para los ODS en las universidades. Una guía para universidades e instituciones de educación superior y terciaria.* <https://irp-cdn.multiscreensite.com/be6d1d56/files/uploaded/accelerating-education-for-the-sdgs-in-unis-ES-web.pdf>

Vanegas, E. y Riascos, L. (2022). Residuos sólidos de origen orgánico, desechos menospreciados y casi despreciados en procesos de reciclaje. *Ciencia Latina. Revista Científica Multidisciplinar*, 6(3), 2455-2478.
https://doi.org/10.37811/cl_rcm.v6i3.2393

Contribution Role	Author(s)
Conceptualization	Rosa Elena De Anda Montano
Methodology	Maria of the Angels Cervantes Roses
Software	Raul Portillo Molina and Rosa Elena De Anda Montano (same)
Validation	Maria de los Angeles Cervantes Rosas, Raul Portillo Molina and Rosa Elena De Anda Montano (equal)
Formal Analysis	Raul Portillo Molina and Rosa Elena De Anda Montano (same)
Investigation	Maria de los Angeles Cervantes Rosas and Rosa Elena De Anda Montano (same)
Resources	Maria de los Angeles Cervantes Rosas and Rosa Elena De Anda Montano (same)
Data curation	Raul Portillo Molina and Rosa Elena De Anda Montano (same)
Writing - Preparing the original draft	Maria de los Angeles Cervantes Rosas, Raul Portillo Molina and Rosa Elena De Anda Montano (equal)
Writing - Review and editing	Maria de los Angeles Cervantes Rosas, Raul Portillo Molina and Rosa Elena De Anda Montano (equal)
Display	Maria de los Angeles Cervantes Rosas, Raul Portillo Molina and Rosa Elena De Anda Montano (equal)
Supervision	Rosa Elena De Anda Montano
Project Management	Rosa Elena De Anda Montano
Acquisition of funds	Maria de los Angeles Cervantes Rosas, Raul Portillo Molina and Rosa Elena De Anda Montano (equal)